



High Park Fire

Water Supplies and Sediment Runoff

Colorado Watershed Assembly

October 2013

Outline

- Why
- Sediment Mitigation
 - ▣ Design
 - ▣ Cost
 - ▣ Permitting
- Petri Dish
- Suggested Approach
 - ▣ Guidebook
 - ▣ Governance Committee

Why Do We Care?



■ Second level

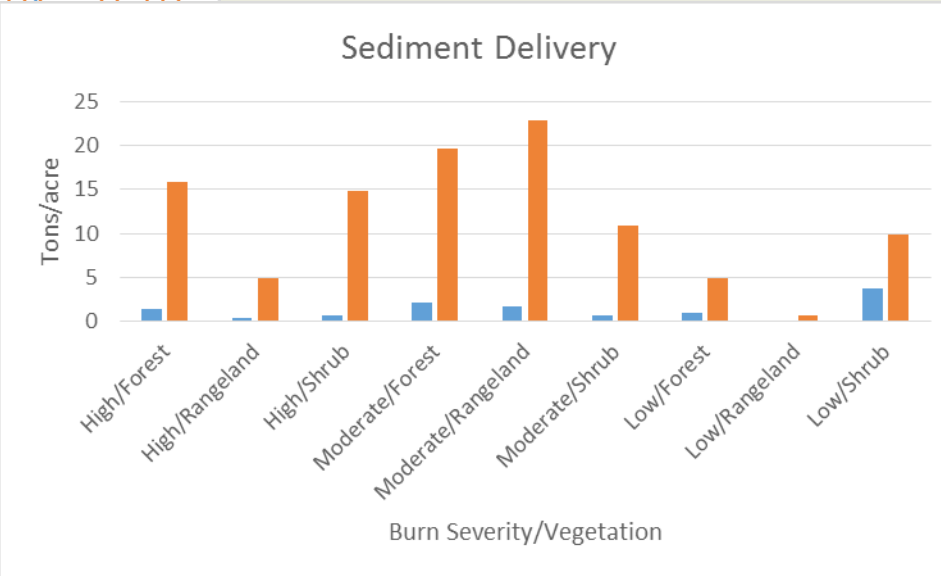
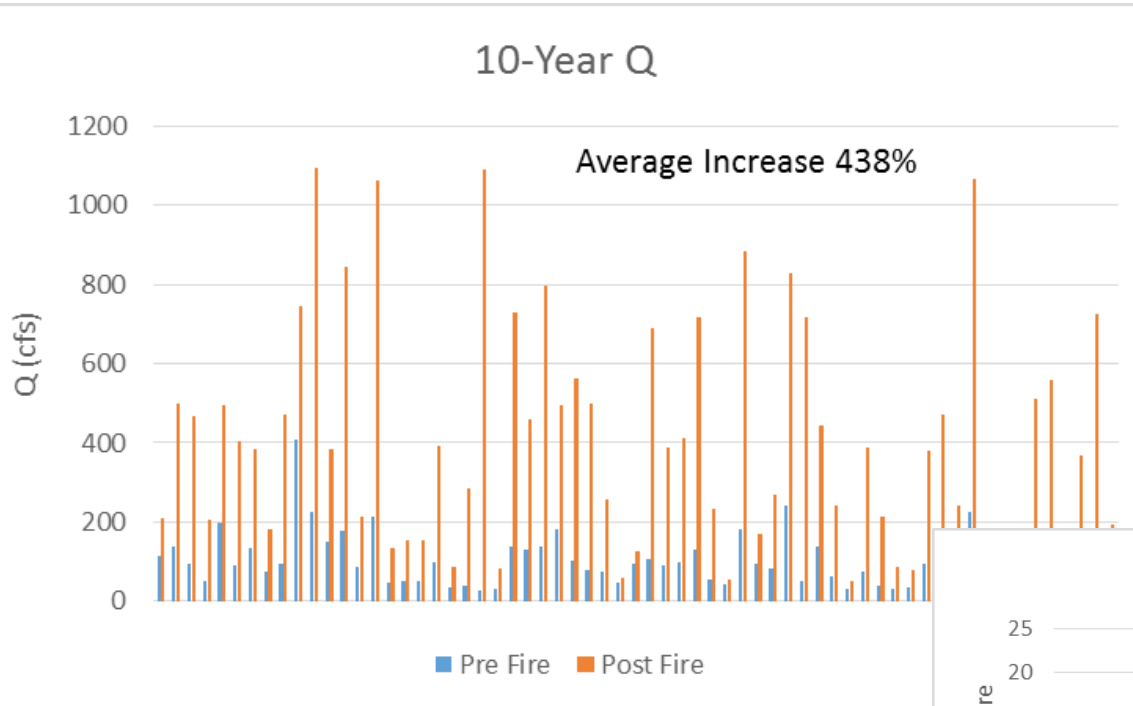
■ Third level

■ Fourth level

■ Fifth level



Potential Damage



Potential Damage

- Safety – flooding & debris flows 20 times greater
- Road washout
- Recreation – campgrounds, access
- Water supply
 - Debris at public water supply intakes
 - Reservoir sedimentation
 - Canal intakes - 18
- Water quality (3-5 years) – ash and sediment; \$3M

North Poudre Diversion Structure



June 21, 2013



June 29, 2013

Skin Gulch A

4-ft high cut bank



2-ft high cut bank



Sediment Deposit



Unnamed #3

Steep Slope Erosion



30% Gradient Driveway



**Clogged 24" CMP Culvert
Hwy 14**



Cross Tie Ranch



Treatments

PBSI High Park Fire 5-Way Mix

PB-33147-09

SPECIES/VARIETY	PURITY	GERM	%MIX	TEST DATE	ORIGIN	LOT#
Quickguard, Sterile Triticale	37.77	96.0	38.77%	6/12	WA	012-6137
Revenue, Slender Wheatgrass	20.56	98.6	20.85%	8/12	CAN	012-6218
Rosana, Cert, Western Wheatgrass	18.92	92.0	20.12%	9/12	WY	012-6298
Lodorm, Green Needlegrass	17.91	81.0	18.29%	12/12	MT	013-6382
MT-1, Sandberg Bluegrass	1.94	84.0	1.97%	12/12	WA	012-6139

NET: 2.69
CROP: 0.00
WEED: 0.21

PAWNEE BUTTES SEED
605 25TH STREET
GREELEY, CO. 80631

NOXIOUS: None **Net Wt:** 27.57



Treatments



Treatments



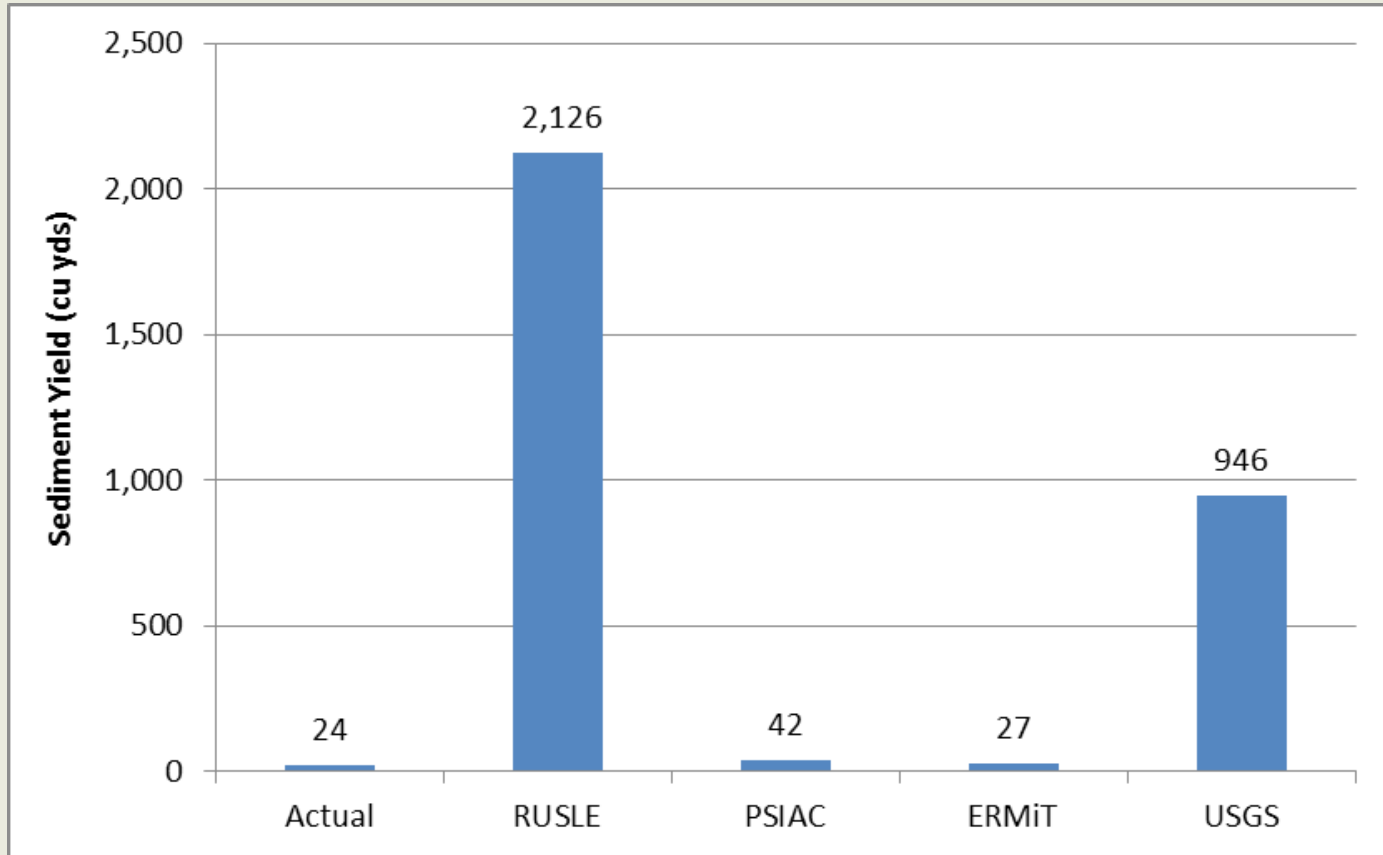
Sediment Mitigation



Sediment Quantification



Sediment Results Comparison



ERMiT Treatments

Mitigation Treatment Comparisons

Probability that sediment yield will be exceeded

% 

 Event sediment delivery (ton ac⁻¹) 

Year following fire

1st year 2nd year 3rd year 4th year 5th year

Untreated 


1.85 0.67 0 0 0

Seeding 

1.85 0.09 0 0 0

Mulch (0.5 ton ac⁻¹) 

0.34 0 0 n n

Mulch (1 ton ac⁻¹) 

0.26 0 0

Mulch (1.5 ton ac⁻¹) 

0.22 0 0

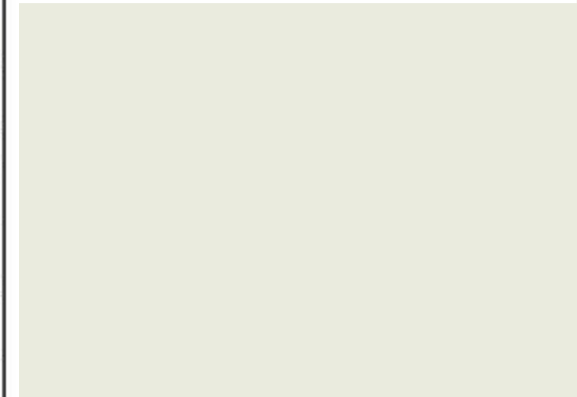
Mulch (2 ton ac⁻¹) 

0.17 0 0

Erosion Barriers: Diameter ft Spacing

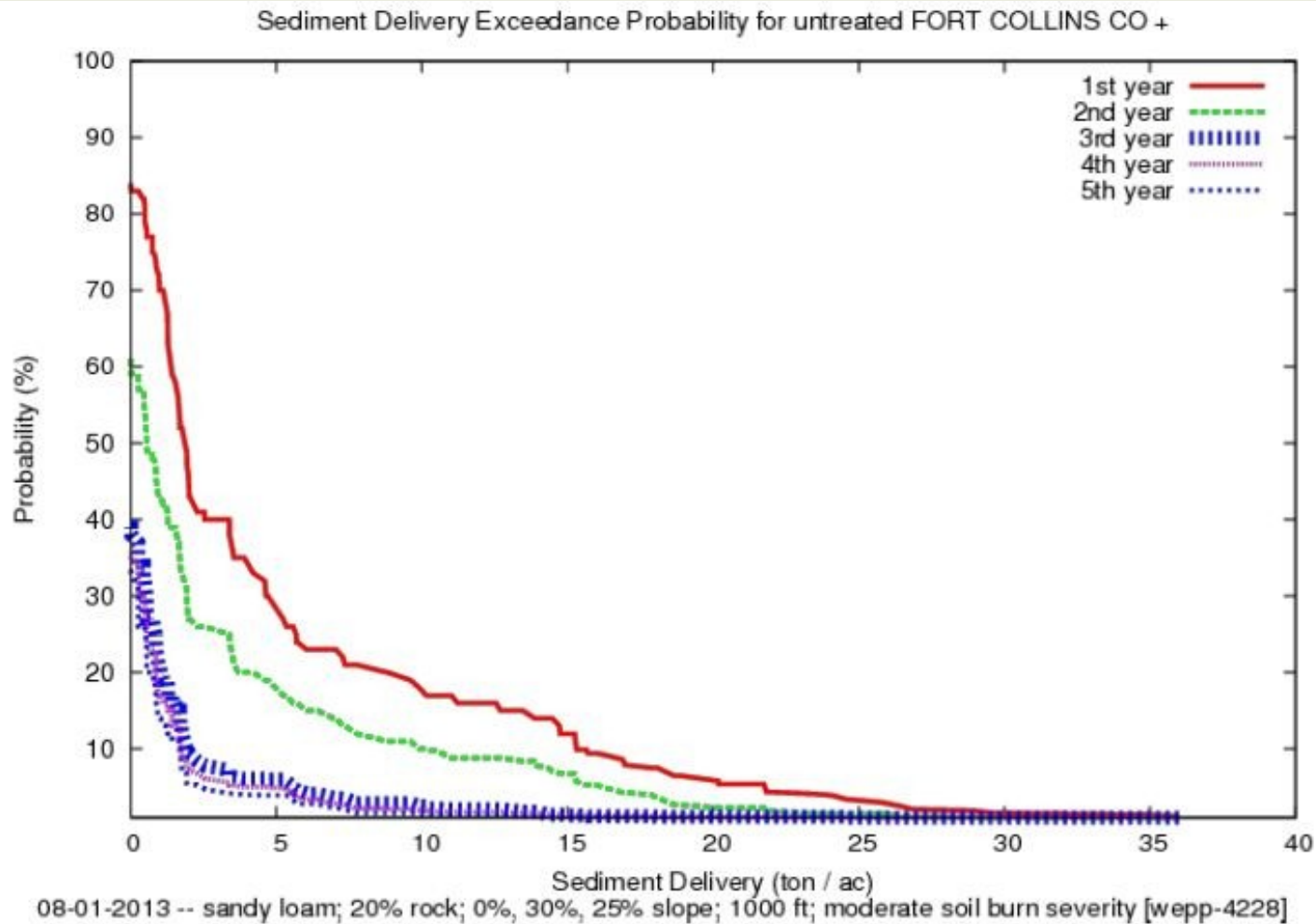
Logs & Wattles 

0 0 0

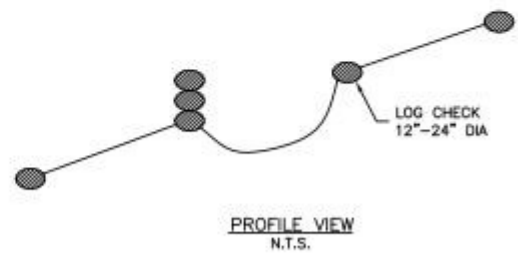
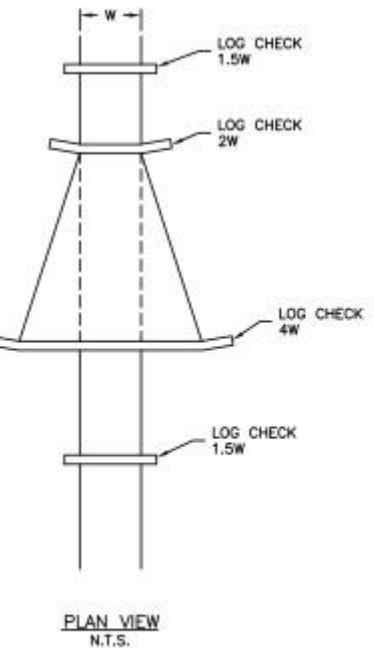
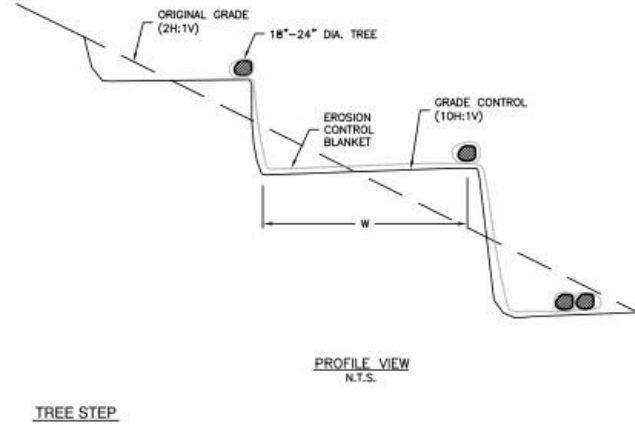
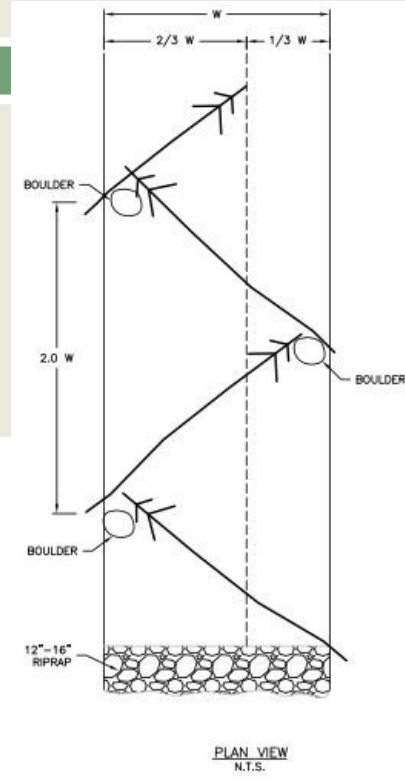
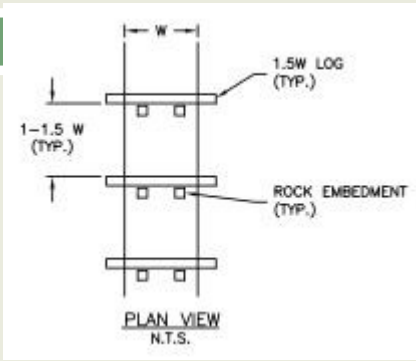


2nd year					
Untreated 0.67	Maximum caught (ton ac ⁻¹)				
12% efficient	Diameter (ft)				
Spacing (ft)	0.17	0.5	1	1.5	3
10	6.59	6.63	6.77	7	8.21
25	3.02	3.06	3.19	3.42	4.63
50	1.82	1.86	2	2.22	3.44
75	1.42	1.46	1.6	1.82	3.04
150	1.03	1.07	1.2	1.43	2.64

ERMiT Sediment Delivery



Design

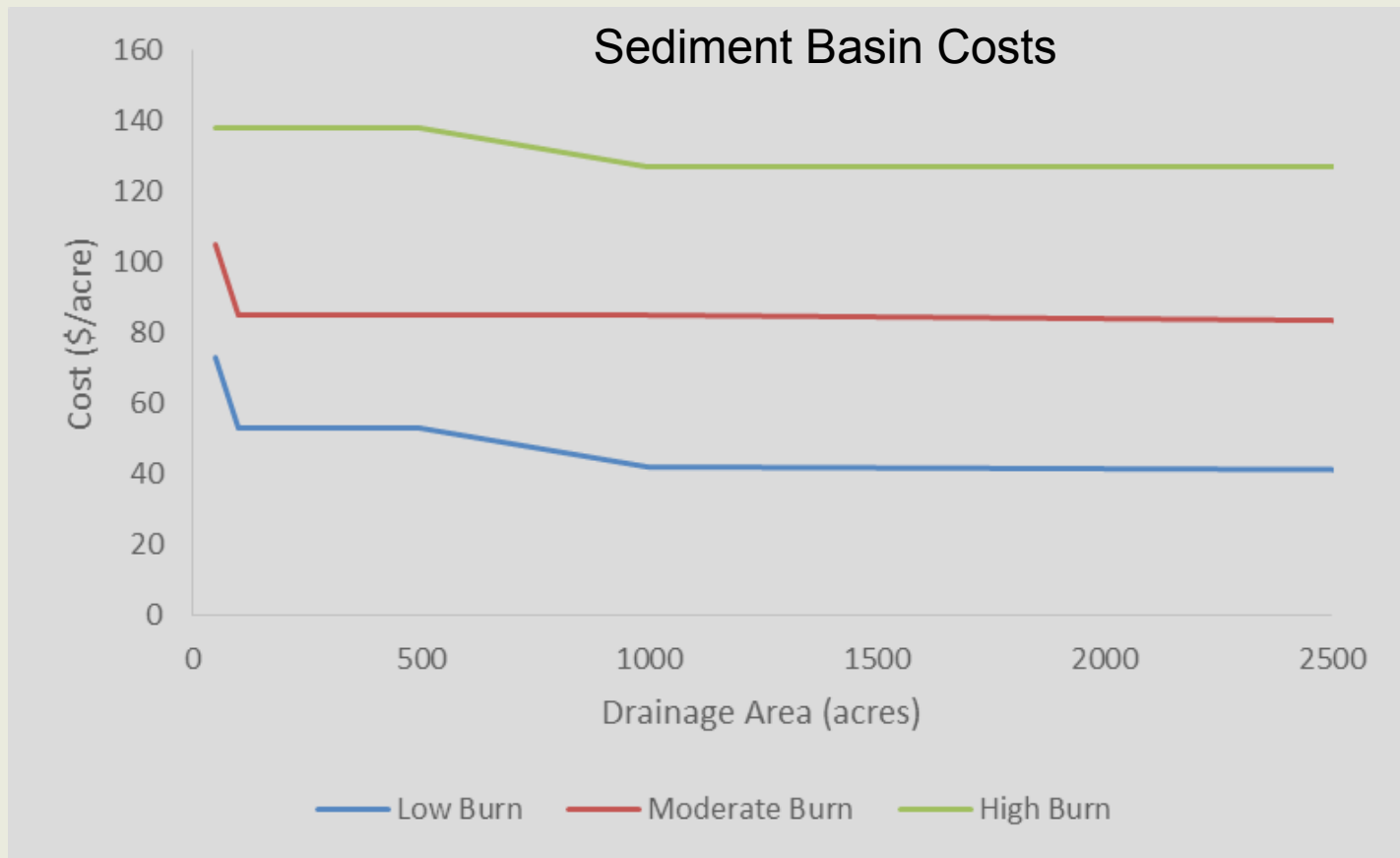


SUB-GRADE BASIN

TREE STEP

Sediment Basins - Cost

- Pro-Active (\$20/yd³) vs. Removal (\$70/yd³)



Permitting

Funding



Going Forward

- Guidebook
- Governance Committee
 - ▣ Align goals
 - ▣ Share lessons learned
 - ▣ Bang for buck
 - ▣ Collaborate for efficient use of limited funds

Federal (2)

-NRCS
-USFS

State (1)

-CO FS

County (1)

-CO FS

**Water
Users (3)**

-WCD
-Municipal
-Ag

Environmental (2)

-Watershed Groups
-TNC, DU

- Click to edit Master text styles
 - Second level
 - Third level
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Treatments

Treatment	USFS Costs	NRCS/ EWP Sponsor Costs	Larimer County Costs	State Costs	Total
Mulching	\$6,912,550	\$5,657,000			\$12,569,550
Weeds	\$36,600	\$0			\$36,600
Seeding for weeds	\$0	\$1,697,100			1,697,100
Channel Debris Clearing	\$0	\$126,000			\$126,000
Sediment Basin & Debris Racks	\$0	\$702,000			\$702,000
Floodwater Detention or Diversion Facilities	\$0	\$1,440,000			\$1,440,000
Storm Inspection & Response	\$0	\$0	\$159,500	*	\$159,500
Increase Culvert Sizing	\$0	\$0	\$6,665,000	*	\$6,665,000
Road and Trail	\$297,549	\$0			\$297,549
Protection and Safety (Closures, signs, etc)	\$5,750	\$276,000		*	\$281,750
Treatment Monitoring	\$6,750				
Agency Total	\$7,259,199	\$9,898,100	\$6,824,500		\$23,975,049

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Second level

Third level

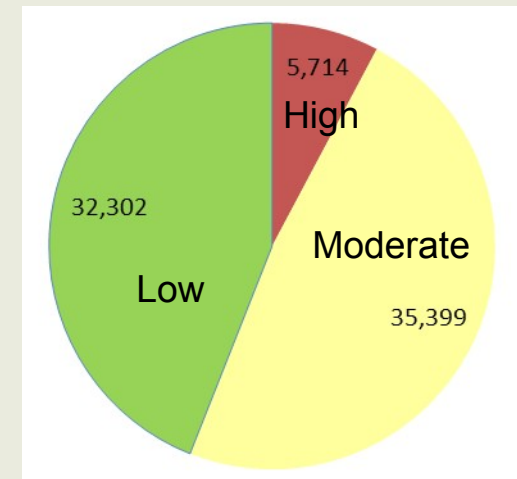
Fourth level

Fifth level



High Park Fire

- 6/9 to 7/1/12
- 1 death, 259 homes
- 60k ac burned in 90k ac perimeter (50/50 federal/private)
- \$39.2M fire suppression (1,000 firefighters)
- 12,000 ac water-repellent soil
- \$24M emergency stabilization treatments?????
- Water supplies: FTC, Greeley



Emergency Stabilization

Private	\$10M
Public	\$17M

High Park Fire - Progression Map
CO-LRX-000329 - June 11, 2012

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